UNITED STATES PATENT AND TRADEMARK OFFICE

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Kirk A. Cesari
Seagate Technology LLC
Intellectual Property Dept. - SHK2LG
1280 Disc Drive
Shakopee, MN 55379-1863

EXAMINER
CHAUDRY, MUJTABA M

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2004*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-20* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *12 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *3/12/2004*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-20 are presented for examination.

Information Disclosure Statement

All the US patent documents listed in the information disclosure statements (IDS) submitted

March 12, 2004 were considered. The foreign patent documents were not provided and therefore

not considered. See 37 CFR 1.97.

Oath/Declaration

The Oath filed March 12, 2004 complies with all the requirements set forth in MPEP 602 and

therefore is accepted.

Drawings

The drawings submitted March 12, 2004 are objected to because:

-       Figure 1 should be designated by a legend such as --Prior Art-- because only that which is

old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37

CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the

application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page

header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If

the changes are not accepted by the examiner, the applicant will be notified and informed

of any required corrective action in the next Office action. The objection to the drawings

will not be held in abeyance.

-       Figure 2 should be designated by a legend such as --Prior Art-- because only that which is

old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37

CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the

application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page

header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If

the changes are not accepted by the examiner, the applicant will be notified and informed

of any required corrective action in the next Office action. The objection to the drawings

will not be held in abeyance.

Appropriate correction is requested.

Specification

The specification is accepted.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in

public policy (a policy reflected in the statute) so as to prevent the unjustified or improper

timewise extension of the "right to exclude" granted by a patent and to prevent possible

harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection

is appropriate where the conflicting claims are not identical, but at least one examined

application claim is not patentably distinct from the reference claim(s) because the examined

application claim is either anticipated by, or would have been obvious over, the reference

claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re*

Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225

USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re*

Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163

USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may

be used to overcome an actual or provisional rejection based on a nonstatutory double patenting

ground provided the conflicting application or patent either is shown to be commonly owned

with this application, or claims an invention made as a result of activities undertaken within the

scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal

disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR

3.73(b).

Claims 1-20 are provisionally rejected on the ground of nonstatutory obviousness-

type double patenting as being unpatentable over claims 1-20 of copending Application No.

10799232. Although the conflicting claims are not identical, they are not patentably distinct

from each other. For example, claims 1 and 2 of the present application teaches a method

comprising: performing a cyclic redundancy check on each of a plurality of code blocks of a

turbo product code (TCP) code word; and assigning an artificially high probability confidence

measure to bits of any of the plurality of code blocks which pass the CRC and iteratively

decoding the TCP code word between a soft decision algorithm and a TPC decoder. Copending

application 10799232 teaches to iteratively decode a TCP code word until a CRC condition is

satisfied. Essentially one is just an embodiment of the other, wherein both basically teach to

iteratively decode a TPC code word based on CRC.

This is a <u>provisional</u> obviousness-type double patenting rejection because the conflicting

claims have not in fact been patented.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing

to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

-       The claim recites, "**a data storage system configured to implement the method of**

        claim 1." It is indefinite because it is not clear what the data storage system actually

        includes.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing

to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

-       The claim recites, "**a communication system configured to implement the method of**

        claim 1." It is indefinite because it is not clear what the communication system actually

        includes.

Applicants are suggested to amend/cancel claims 10 and 12.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis

for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 12-15 and 19-20 are rejected under 35 U.S.C. 102(e) as being anticipated by

Lavi et al. (herein after: Lavi) USPN 6950977.

As per claim 1, Lavi teaches performing a cyclic redundancy check on each of a plurality

of code blocks of a turbo product code (TCP) code word (i.e., col. 3, lines 56-59); and assigning

an artificially high probability confidence measure to bits of any of the plurality of code blocks

which pass the CRC (i.e., col. 3, lines 55-56).

As per claim 2, Lavi teaches, in view of above rejections, iteratively decoding the TCP

code word between a soft decision algorithm (i.e., Figure 4, reference number 30) and a TCP

decoder (i.e., Figure 4, reference number 33) using the artificially high probability confidence

measure (i.e., Figure 4, reference number 36) assigned to the bits of code block with pass the

CRC (i.e., Figure 4 and col. 56, lines 40-57).

As per claim 3, Lavi teaches, in view of above rejections, performing the CRC on each of

the plurality of code blocks during a first iteration between the soft decision algorithm (i.e.,

Figure 4, reference number 30) and the TCP decoder (i.e., Figure 4, reference number 33 and col.

5, lines 13-20).

As per claim 4, Lavi teaches, in view of above rejections, performing the CRC (i.e.,

Figure 6, reference number 36) on each of the code blocks after decoding using the TCP decoder

(i.e., Figure 6, reference number 33) and before corresponding probability confidence measures

from the plurality of code blocks are set back to the soft decision algorithm (i.e., Figure 6,

reference number 39, output sent back to input of decoder 1, reference number 30).

As per claim 5, Lavi teaches, in view of above rejections, to perform CRC (i.e., Figures 4

and 6) during each iteration between soft decision algorithm (i.e., Figure 4, reference number 30)

and TCP decoder (i.e., Figure 4, reference number 33) and wherein assigning probability

measure (i.e., Figure 4, reference number 36) to bits of code block which pass the CRC during

the iteration (i.e., Figure 4 and col. 5, lines 13-57).

As per claim 12, Lavi teaches, in view of above rejections, (i.e., col. 1, lines 51-55) a

communication system.

As per claim 13, Lavi teaches, in view of above rejections, an apparatus comprising an

iterative decoder (i.e., Figure 6) configured to iteratively decode a turbo product code word;

cyclic redundancy check implementing circuitry configured to perform CRC on each of a

plurality of code blocks of the TCP code word (i.e., Figure 6, reference number 36); and pre-

determined extrinsic information generating circuitry (i.e., Figure 6, reference number 39)

configured to assign extrinsic information representing an artificially high probability confidence

measure to bits of any of the plurality of code blocks which pass the CRC (i.e., Figure 6 and col.

3, lines 55-56).

As per claim 14, Lavi teaches, in view of above rejections, the cyclic redundancy check

implementing circuitry forms part of the iterative decoder (i.e., Figure 6, reference number 36).

As per claim 15, Lavi teaches, in view of above rejections, the iterative decoder

comprises soft decision circuit (i.e., Figure 6, reference number 30) and TCP decoder (i.e.,

Figure 6, reference number 34).

As per claim 19, Lavi teaches, in view of above rejections, to perform the CRC (i.e.,

Figure 6, reference number 36) on each of the code blocks after decoding using the TPC decoder

(i.e., Figure 6, reference number 33) and before the corresponding extrinsic information (i.e.,

Figure 6, output of reference number 39) is sent back to the soft decision algorithm.

As per claim 20, Lavi teaches, in view of above rejections, the iterative decoder and the

CRC (i.e., Figure 6) circuit perform CRC (i.e., Figure 6, output of reference number 36) on each

code block during each iteration between soft decision algorithm (i.e., Figure 6, output of

reference number 30) and the TCP decoder (i.e., Figure 6, output of reference number 33) and

wherein the predetermined extrinsic information (i.e., Figure 6, output of reference number 39) is

assigned during each iteration in which the CRC passes (i.e., Figure 4 and col. 5, lines 13-57).

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966),

that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6-11 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lavi

et al. (herein after: Lavi) USPN 6950977 further in view of Applicants Admitted Prior Art

(AAPA).

As per claim 6, Lavi does not explicitly teach, in view of above rejections, the probability

measures are log-likelihood ratios. However, AAPA teaches (i.e., page 1, lines 27-29) soft

decision algorithms such as SOVA typically take the form of log-likelihood values. Therefore to

use log-likelihood ratios to calculate the probability measures would be an obvious engineering

design choice since log-likelihood ratios is just another form of representing and analyzing data.

As per claim 7, Lavi does not explicitly teach, in view of above rejections, the soft

decision algorithm is a SOVA. However, AAPA teaches (i.e., page 1, lines 27-29) soft decision

algorithms such as SOVA typically take the form of log-likelihood values. Therefore to use

SOVA as the soft decision algorithm would be an obvious engineering design choice.

As per claim 8, Lavi does not explicitly teach, in view of above rejections, the soft

decision algorithm is a BCJR algorithm. However, AAPA teaches (i.e., page 1, lines 20-28) soft

decision algorithms such as BCJR. Therefore to use BCJR as the soft decision algorithm would

be an obvious engineering design choice.

As per claim 9, Lavi does not explicitly teach, in view of above rejections, the TCP word

with a single parity check. However, AAPA teaches (i.e., page 1, line 20) the TCP word with a

single parity check (TCP/SPC). Therefore to use TCP/SPC would be an obvious engineering

design choice.

As per claim 10, Lavi does not explicitly teach a data storage system. However, Lavi

substantially teaches, in view of above rejections, (col. 1, line 15) error detection and correction

for digital communications. It is well known in the art for a data storage system to utilize error detection and correction schemes since it is a form of digital communication.

As per claim 11, Lavi does not explicitly teach, in view of above rejections, the TCP word to be 512 bytes. However, AAPA teaches (i.e., page 1, line 18) the TCP word with 512 bytes. Therefore to use 512 byte TCP word would be an obvious engineering design choice.

As per claim 16, Lavi does not explicitly teach, in view of above rejections, the soft decision algorithm is a SOVA. However, AAPA teaches (i.e., page 1, lines 27-29) soft decision algorithms such as SOVA typically take the form of log-likelihood values. Therefore to use SOVA as the soft decision algorithm would be an obvious engineering design choice.

As per claim 17, Lavi does not explicitly teach, in view of above rejections, the soft decision algorithm is a BCJR algorithm. However, AAPA teaches (i.e., page 1, lines 20-28) soft decision algorithms such as BCJR. Therefore to use BCJR as the soft decision algorithm would be an obvious engineering design choice.

As per claim 18, Lavi does not explicitly teach, in view of above rejections, the TCP word with a single parity check. However, AAPA teaches (i.e., page 1, line 20) the TCP word with a single parity check (TCP/SPC). Therefore to use TCP/SPC would be an obvious engineering design choice.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts are included herein for Applicant's review.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817. The examiner can normally be reached on Mon-Fri 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on 571-272-6962.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mujtaba Chaudry
Art Unit 2112
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